

We claim:

1. An isolated DNA sequence comprising a promoter or a promoter fragment of a mycobacterial secreted acid phosphatase gene wherein the promoter or the promoter fragment is sufficient to control expression of a nucleotide sequence of interest and is inducible under low-pH conditions.
2. The isolated DNA sequence of claim 1, wherein the promoter or the promoter fragment is selected from the group consisting of a *Mycobacterium tuberculosis* sapM promoter or promoter fragment, a *Mycobacterium bovis* sapM promoter or promoter fragment, a *Mycobacterium avium* sapM promoter or promoter fragment, and a *Mycobacterium marinum* sapM promoter or promoter fragment.
3. An isolated DNA sequence comprising a promoter or a promoter fragment sufficient to control expression of a nucleotide sequence of interest and inducible under low-pH conditions, wherein the promoter or the promoter fragment hybridize to a sapM promoter selected from the group consisting of a *Mycobacterium tuberculosis* sapM promoter [SEQ ID NO:1], a *Mycobacterium bovis* sapM promoter [SEQ ID NO:2], a *Mycobacterium avium* sapM promoter [SEQ ID NO:3] and a *Mycobacterium marinum* sapM promoter [SEQ ID NO:4] under high stringency hybridization conditions.
4. An expression vector comprising the isolated DNA sequence of claim 1, 2 or 3.
5. A host cell transformed with the vector of claim 4.
6. A transcription cassette comprising:
 - (a) a mycobacterial secreted acid phosphatase promoter or promoter fragment, wherein the promoter or the promoter fragment is sufficient to control expression of a nucleotide sequence of interest;
 - (b) a nucleotide sequence of interest operably linked to the promoter or the promoter fragment; and

(c) a transcriptional termination region.

7. The transcription cassette of claim 6 wherein the mycobacterial secreted acid phosphatase promoter or promoter fragment is selected from the group consisting of a *Mycobacterium tuberculosis* sapM promoter [SEQ ID NO:1], a *Mycobacterium bovis* sapM promoter [SEQ ID NO:2], a *Mycobacterium avium* sapM promoter [SEQ ID NO:3], and a *Mycobacterium marinum* sapM promoter [SEQ ID NO:4].

8. The transcription cassette of claim 6 or 7 further comprising a mycobacterial secreted acid phosphatase N-terminal signal sequence.

9. The transcription cassette of claim 8 wherein the mycobacterial secreted acid phosphatase N-terminal signal sequence is selected from the group consisting of a *Mycobacterium tuberculosis* sapM N-terminal signal sequence [SEQ ID NO:5], a *Mycobacterium bovis* sapM N-terminal signal sequence [SEQ ID NO:6], a *Mycobacterium avium* sapM N-terminal signal sequence [SEQ ID NO:7], and a *Mycobacterium marinum* sapM N-terminal signal sequence [SEQ ID NO:8].

10. A method for the diagnosis of a pathogenic mycobacterial infection or a pathogenic fungal infection in a subject comprising:

- (a) obtaining a biological sample from a subject; and
- (b) analyzing the sample for the presence of antibodies specific to a mycobacterial secreted acid phosphatase wherein detection of antibodies specific to the mycobacterial secreted acid phosphatase is indicative of the presence of the pathogenic mycobacterial infection or the pathogenic fungal infection.

11. The method of claim 10, wherein the mycobacterial secreted acid phosphatase is selected from the group consisting of a *Mycobacterium tuberculosis* SapM [SEQ ID NO:10], a *Mycobacterium bovis* SapM [SEQ ID NO:12], a *Mycobacterium avium* SapM [SEQ ID NO:14], and a *Mycobacterium marinum* SapM [SEQ ID NO:16].

12. A method for the diagnosis of a pathogenic mycobacterial infection or a pathogenic fungal infection in a subject comprising:

- (a) obtaining a nucleic acid sample from a subject; and
- (b) analyzing the sample for the presence of a nucleic acid encoding a mycobacterial secreted acid phosphatase wherein detection of the nucleic acid encoding the mycobacterial secreted acid phosphatase is indicative of the presence of the pathogenic mycobacterial infection or a pathogenic fungal infection.

13. The method of claim 12 wherein the nucleic acid encoding the mycobacterial secreted acid phosphatase is selected from the group consisting of a *Mycobacterium tuberculosis* sapM, a *Mycobacterium bovis* sapM, a *Mycobacterium avium* sapM, and a *Mycobacterium marinum* sapM.

14. A method for the diagnosis of a pathogenic mycobacterial infection or a pathogenic fungal infection in a subject comprising:

- (a) obtaining a biological sample from a subject; and
- (b) analyzing the sample for the presence of a mycobacterial secreted acid phosphatase activity, wherein detection of the mycobacterial secreted acid phosphatase activity is indicative of the presence of the pathogenic mycobacterial infection or the pathogenic fungal infection.

15. The method of claim 14, wherein the mycobacterial secreted acid phosphatase activity is selected from the group of mycobacteria consisting of a *Mycobacterium tuberculosis* SapM activity, a *Mycobacterium bovis* SapM activity, a *Mycobacterium avium* SapM activity, and a *Mycobacterium marinum* SapM activity.

16. A method of screening for a compound capable of modulating production of a mycobacterial secreted acid phosphatase comprising:

- (a) providing a nucleic acid construct comprising a mycobacterial secreted acid phosphatase promoter or promoter fragment, wherein the promoter or

the promoter fragment is operably linked to a reporter gene capable of producing a measurable signal;

- (b) providing a test compound;
- (c) exposing the nucleic acid construct to the test compound; and
- (d) measuring the signal produced by the reporter gene, wherein a change in the signal produced in the presence of the test compound as compared to in the absence of the test compound indicates that the test compound is capable of modulating production of the mycobacterial secreted acid phosphatase.

17. The method of claim 16, wherein the mycobacterial secreted acid phosphatase promoter or promoter fragment is selected from the group consisting of a *Mycobacterium tuberculosis* sapM promoter or promoter fragment, a *Mycobacterium bovis* sapM promoter or promoter fragment, a *Mycobacterium avium* sapM promoter or promoter fragment, and a *Mycobacterium marinum* sapM promoter or promoter fragment.

18. A method of screening for a compound capable of modulating the activity of a mycobacterial secreted acid phosphatase comprising:

- (a) incubating a mixture comprising a mycobacterial secreted acid phosphatase, a substrate for the mycobacterial secreted acid phosphatase, and a test compound; and
- (b) measuring the activity of the mycobacterial secreted acid phosphatase; wherein a change in activity in the presence of the test compound as compared to in the absence of the test compound indicates that the test compound is capable of modulating the activity of the secreted acid phosphatase.

19. The method of claim 18, wherein the mycobacterial secreted acid phosphatase is selected from the group consisting of a *Mycobacterium tuberculosis* SapM, a *Mycobacterium bovis* SapM, a *Mycobacterium avium* SapM, and a *Mycobacterium marinum*.

20. A method of screening for a compound capable of modulating secretion of a mycobacterial secreted acid phosphatase comprising:

- (a) exposing mycobacterium cells to a test compound, wherein the mycobacterium cells secrete a mycobacterial secreted acid phosphatase and
- (b) measuring the amount of the mycobacterial secreted acid phosphatase, secreted by the mycobacterium cells, wherein a change in the secretion of the mycobacterial secreted acid phosphatase in the presence of the test compound as compared to in the absence of the test compound indicates that the test compound is capable of modulating the secretion of the mycobacterial secreted phosphatase.

21. The method of claim 20, wherein the mycobacterial secreted acid phosphatase is selected from the group consisting of a *Mycobacterium tuberculosis* SapM, a *Mycobacterium bovis* SapM, a *Mycobacterium avium* SapM, and a *Mycobacterium marinum* SapM.

22. A kit for the detection of a pathogenic mycobacterial disease or infection comprising:

- (a) a mycobacterial secreted acid phosphatase;
- (b) at least one antibody specific for the mycobacterial secreted acid phosphatase ; and
- (c) one or more reagents necessary for detection of the antibody.

23. The kit of claim 22, wherein the mycobacterial secreted acid phosphatase is selected from the group consisting of *Mycobacterium tuberculosis* SapM, *Mycobacterium bovis* SapM, *Mycobacterium avium* SapM, and *Mycobacterium marinum* SapM.

24. A kit for the detection of a pathogenic mycobacterial disease or infection comprising:

- (a) an oligonucleotide comprising contiguous nucleotides from the nucleic acid sequence that is complementary to the sequence of [SEQ ID NO:1] to [SEQ ID NO:4], or [SEQ ID NO:9], [SEQ ID NO:11], [SEQ ID NO:13], [SEQ ID

NO:15] and capable of specifically hybridizing to the complementary nucleotide sequence; and

(b) reagents for hybridization of the oligonucleotide to a complementary nucleic acid sequence.

25. An antibody which is capable of specifically binding to a mycobacterial secreted acid phosphatase or a polypeptide fragment thereof.

26. The antibody of claim 25, wherein the mycobacterial secreted acid phosphatase is selected from the group consisting of *Mycobacterium tuberculosis* SapM [SEQ ID NO:10], *Mycobacterium bovis* SapM [SEQ ID NO:12], *Mycobacterium avium* SapM [SEQ ID NO:14], and *Mycobacterium marinum* [SEQ ID NO:16] SapM.

27. A vaccine or immunogenic composition for treatment or prophylaxis of a mammal against challenge by a mycobacterium comprising the antibody of claim 26.

28. A vaccine or immunogenic composition for treatment or prophylaxis of a mammal against challenge by a mycobacterium comprising the isolated DNA sequence claim 1,2 or 3.

29. A vaccine or immunogenic composition for the treatment or prophylaxis of a mammal against challenge by a mycobacterium comprising a mycobacterial secreted acid phosphatase selected from the group consisting of a *Mycobacterium tuberculosis* SapM, a *Mycobacterium bovis* SapM, a *Mycobacterium avium* SapM, and a *Mycobacterium marinum* SapM or a polypeptide fragment thereof.

30. An antigenic composition useful for the detection of a pathogenic mycobacterial disease or infection in a subject comprising a SapM polypeptide and substantially free from other proteins or glycoproteins with which it is natively admixed in a culture of pathogenic mycobacteria.